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GAI CONSULTANTS INC MONROEVILLE PA  
NATIONAL DAM INSPECTION PROGRAM. STRAIGHT RUN DAM (NDI NUMBER P--ETC(U)  
JUL 78

F/G 13/2

DACW31-78-C-0052

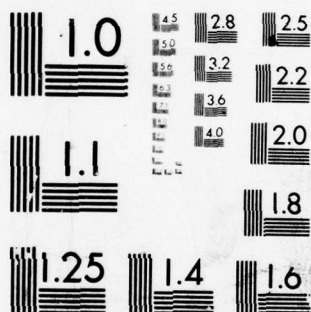
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**LEVEL II**

OHIO RIVER BASIN  
STRAIGHT RUN, INDIANA COUNTY

PENNSYLVANIA

STRAIGHT RUN DAM

NDI No. Pa. - 283

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PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

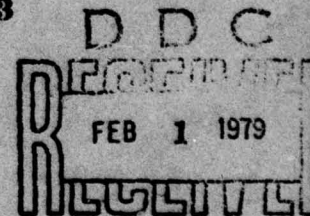


PREPARED FOR

DEPARTMENT OF THE ARMY  
Baltimore District, Corps of Engineers  
Baltimore, Maryland 21203

PREPARED BY

GAI CONSULTANTS, INC.  
570 BEATTY ROAD  
MONROEVILLE, PENNSYLVANIA 15146  
AUGUST 1978



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# LEVEL II

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## PHASE I REPORT National Dam Inspection Program

Straight Run Dam  
Pennsylvania  
Indiana County  
Straight Run

National Dam Inspection Program,  
Straight Run Dam (NDI Number PA-283),  
Ohio River Basin, Straight Run,  
Indiana County, Pennsylvania.  
Phase I Inspection Report.

11 14 July 1978

Inspection Team - GAI Consultants, Inc.  
570 Beatty Road  
Monroeville, Pennsylvania

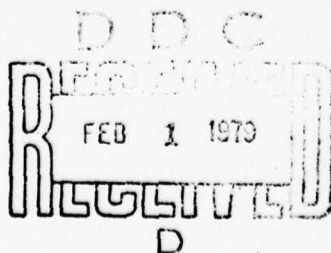
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Based on a visual inspection, past performance, and available engineering data, the facility is considered to be in good condition. The emergency spillway is capable of passing the flow resulting from a storm of PMF intensity without overtopping the embankment; thus, the spillway is deemed adequate.

It is recommended that:

1. A formal warning system be developed to ensure the safe evacuation of all inhabitants immediately downstream should the need arise;
2. The owner develop a manual for the operation and maintenance of the outlet works at the facility;
3. Positive drainage be provided to relieve the swampy condition beyond the toe;
4. The owner patch, repair, and seal those areas in the spillway exhibiting minor concrete deterioration;
5. The facility be inspected on an annual basis to check for deleterious conditions which might develop. The outlet conduit should be inspected for cracks or joint openings which would permit the influx of embankment fines.



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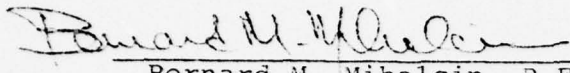
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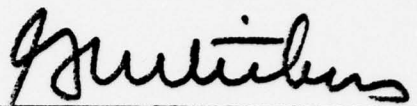
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GAI Consultants, Inc.

Approved by:

  
Bernard M. Mihalcin, P.E.

  
G. C. WITHERS  
Colonel, Corps of Engineers  
District Engineer



Date 13 Sept. 78

Date 22 Sep 78



Overview photograph of Straight Run Dam.

## TABLE OF CONTENTS

	<u>Page</u>
SYNOPSIS . . . . .	i
OVERVIEW PHOTOGRAPH. . . . .	iii
TABLE OF CONTENTS. . . . .	iv
SECTION 1 - GENERAL INFORMATION. . . . .	1
1.0 Authority. . . . .	1
1.1 Purpose. . . . .	1
1.2 Description of Project . . . . .	1
1.3 Pertinent Data . . . . .	2
SECTION 2 - ENGINEERING DATA . . . . .	5
2.1 Design . . . . .	5
2.2 Construction Records . . . . .	7
2.3 Operation. . . . .	8
2.4 Other Investigations . . . . .	8
2.5 Evaluation . . . . .	8
SECTION 3 - VISUAL INSPECTION. . . . .	9
3.1 Observations . . . . .	9
SECTION 4 - OPERATIONAL PROCEDURES . . . . .	11
4.1 Normal Operating Procedure . . . . .	11
4.2 Maintenance of Dam . . . . .	11
4.3 Maintenance of Operating Facilities. . . . .	11
4.4 Warning Systems in Effect. . . . .	11
4.5 Evaluation . . . . .	11
SECTION 5 - HYDROLOGIC/HYDRAULIC EVALUATION. . . . .	12
5.1 Design Data. . . . .	12
5.2 Experience Data. . . . .	12
5.3 Visual Observations. . . . .	12
5.4 Overtopping Potential. . . . .	12
5.5 Spillway Adequacy. . . . .	13
SECTION 6 - EVALUATION OF STRUCTURAL INTEGRITY . . . . .	14
6.1 Visual Observations. . . . .	14
6.2 Design and Construction Techniques . . . . .	14
6.3 Past Performance . . . . .	14
6.4 Seismic Stability. . . . .	14
SECTION 7 - ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES. . . . .	15
7.1 Dam Assessment . . . . .	15
7.2 Recommendations/Remedial Measures. . . . .	15

## TABLE OF CONTENTS

APPENDIX A - CHECK LIST - VISUAL INSPECTION
APPENDIX B - CHECK LIST - ENGINEERING DATA
APPENDIX C - HYDRAULICS AND HYDROLOGY CALCULATIONS
APPENDIX D - PHOTOGRAPHS
APPENDIX E - GEOLOGY
APPENDIX F - FIGURES
APPENDIX G - REGIONAL VICINITY MAP



PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM  
STRAIGHT RUN DAM  
NDI# PA-283, PENNDER# 32-76

1.0 Authority.

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

1.1 Purpose.

The purpose is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Straight Run Dam is an earth embankment approximately 690 (field measured) feet in length with a maximum height of 43 feet. The facility is equipped with an outlet works consisting of a concrete riser and a 30-inch low level concrete outlet conduit. The conduit has its intake at the upstream toe of the dam (see Figure 5). Flow is controlled at a reinforced concrete riser located approximately 20 feet upstream from the crest. Stop logs and a manually operated gate are used to regulate discharge. Excess inflow passes over a concrete ogee-shaped emergency spillway located on the right abutment (see Figure 3, and Photographs 6, 7 and 8).

b. Location. Straight Run Dam is located on Straight Run in Banks Township, Indiana County, Pennsylvania (see Appendix G). The dam is located approximately 1-1/2 miles south of Johnsonburg on State Route 336. Dam, reservoir, and watershed are contained within the Burnside, McGees Mills, Punxsutawny and Rochester Mills U.S.G.S. 7.5 minute quadrangles. The coordinates of the dam are N 40° 51' 40" and W 78° 53' 10".

c. Size Classification. Intermediate (43 feet high, 900 acre-feet storage capacity).

d. Hazard Classification. Significant (see Section 3.1.c.4).

e. Ownership. Pennsylvania Fish Commission  
R. D. #1, Box 70  
Bellefonte, Pennsylvania 16823

f. Purpose of Dam. Recreation.

g. Historical Data. Straight Run Dam was designed by Gwin Engineers, Inc., of Altoona, Pennsylvania. Construction of the facility commenced in July of 1969 by GAL Construction, Inc., of Pittsburgh, Pennsylvania. The project was completed in September of 1970 without any apparent major modifications to the original plans and specifications.

As early as the summer of 1974, areas of seepage were discovered along the right (west) abutment. A visual inspection by Pennsylvania Fish Commission personnel revealed a crevice in the spillway forebay 6 x 3 inches wide where water was entering and forming a visible whirlpool. Seepage areas were located at this time on both sides of the spillway approximately 18 feet below the spillway crest.

The firm of F. T. Kitliniski and Associates, Inc., of Harrisburg, Pennsylvania, was contracted in the fall of 1974 to perform corrective grouting. The grouting program was completed July 31, 1975 and is considered successful since seepage has not reappeared to date.

1.3 Pertinent Data.

a. Drainage Area. 1.49 square miles.

b. Discharge at Dam Site. Discharge records are not available at this facility nor is there any record of a maximum water level.

Outlet Works Conduit at Operating Pool Elevation - Discharge curve not available.

Spillway Capacity at Maximum Pool Elevation  $\approx$  3900 cfs (at el. 1746.0).

c. Elevation (feet above mean sea level).

Top of Dam - 1746.5

Maximum Pool Design Surcharge - 1743.5.

Maximum Pool of Record - Not known.

Normal Pool - 1738.5.

Upstream Portal Invert Outlet Conduit - 1703.0.

Downstream Portal Invert Outlet Conduit - 1701.7.

Streambed at Dam Centerline  $\approx$  1703.

Maximum Tailwater - Not known.

d. Reservoir Length (miles).

Maximum Pool  $\approx$  1.0 (elevation 1746.5 - top of dam).

Normal Pool  $\approx$  0.8 (elevation 1738.5 - spillway crest).

e. Storage (acre-feet).

Top of Dam  $\approx$  1520 (elevation 1746.5).

Normal Pool  $\approx$  900 (elevation 1738.5).

Design Surcharge  $\approx$  300 (elevation 1743.5).

f. Reservoir Surface (acres).

Top of Dam  $\approx$  95.

Normal Pool  $\approx$  60.

Maximum Design Pool  $\approx$  68.

g. Dam.

Type - Earth.

Length - 690 feet.

Height - 43 feet.

Side Slopes - upstream 3.5H:1V  
downstream 2.5H:1V

Zoning - Homogeneous earth, 18 inches of dumped riprap on an 8-inch crushed stone base along the upstream face. A nine-inch blanket drain discharges into a toe drain (see Figure 4).

Impervious Core - None.

Cutoff - As-Built drawings indicate a cutoff trench was excavated beneath the dam centerline and back-filled with embankment material.

Grout Curtain - The original design did not provide for a grout curtain. A grouting program was initiated after construction when seepage was noted on both sides of the spillway and a whirlpool formed in the spillway forebay.

h. Outlet Conduit.

Type - 30-inch diameter prestressed concrete, low level conduit with intake at the upstream toe of the embankment and gated at the base of the vertical riser. Flow is carried beyond the riser and discharged at the downstream toe.

Length -  $\approx$  280 feet.

Closure - 24-inch sluice gate is located at the base of the riser and operated from above.

Access - The gate control is located within the riser. It is situated on a ledge just below the roof hatch and is readily accessible (see Photograph 4).

Regulating Facilities - Normal flow is regulated by the use of wooden stop logs located at the base of the riser. Drawdown is controlled with a 24-inch sluice gate located at the base of the riser.

i. Spillway.

Type - Uncontrolled concrete spillway with an ogee-shaped crest.

Length of Weir - 50 feet.

Crest Elevation - 1738.5.

Upstream Channel - Short, curved, natural channel. Depth of forebay behind spillway is 2.5 feet.

Downstream Channel - Concrete spillway chute empties into a stilling basin before discharging into a broad floodplain less than 200 feet downstream of the embankment (see Photograph 7).

j. Regulating Outlets. 30-inch diameter low level concrete conduit as described in Section 1.3.h.



SECTION 2  
ENGINEERING DATA

2.1 Design Data.

a. Design Data Availability and Sources.

1. Hydrology and Hydraulics. No design reports are available. Design computations are contained within the files of Gwin, Dobson, and Foreman, Inc., of Altoona, Pennsylvania. These data were reviewed by GAI personnel.

2. Embankment. No detailed design reports are available. A partial list of information available includes the following:

Evaluation of Dam Site      a) General Description and Preliminary

b) Partial Soil Map of Dam Site

c) Soil Analysis

d) Geology

e) Results of Subsurface Explorations

f) Location Plan

g) Location Soil Test Holes

h) Location of Holes for Core Drilling

i) Plan of Core Boring Results

j) Location Plan of Auger Borings

Coal Outcrop      k) Plan Showing Approximate Location of

Camber (profile)      l) Dam Embankment Upstream Curvature and

Profile of Dam Embankment      m) Plan of Upstream Curvature of Dam and

n) Slope Stability

o) Seepage Line Reference

- Drawdown
- p) Stability Analysis - Upstream Slope -
  - q) Stability Analysis - Downstream Slope

The above data are contained within the files of Gwin, Dobson, and Foreman, Inc., of Altoona, Pennsylvania and were reviewed by GAI personnel.

3. Appurtenant Structures. No design reports are available. Design computations pertaining to the appurtenances are contained within Gwin, Dobson, and Foreman, Inc. files.

b. Design Features.

1. Embankment. Available drawings indicate the dam embankment is a homogeneous earthfill structure with a 3.5H:1V upstream slope, a 2.5H:1V downstream slope, and a 20-foot wide crest. A 15-foot wide (bottom width) cutoff trench has apparently been placed along the embankment centerline to depths of as much as 25 feet. A downstream blanket drain comprised of a 9-inch thick compacted layer of sand and a toe drain trench backfilled with sand and stone are shown located at the downstream toe. A 6-inch perforated pipe is contained within the toe drain. An 18-inch layer of rock riprap placed on an 8-inch layer of 2B stone mantles the upstream face between elevation 1734.0 and the top of dam, elevation 1746.5. Grass mantles the crest while the downstream slope is covered with crown vetch (see Photographs 2 and 5).

2. Appurtenant Structures.

a) Emergency Spillway. The emergency spillway is a concrete ungated channel located at the right abutment. It consists of an unpaved entrance channel, ogee-shaped weir, a concrete lined spillway chute and a stilling basin. The weir is 50 feet long at the point of control. The total length of the concrete chute is approximately 200 feet. The channel is rectangular in cross-section and tapers from 50 feet at the weir to 30 feet at the entrance to the stilling basin. The stilling basin is approximately 27 feet long and is equipped with chute blocks and baffles. The drop in elevation from the weir to the stilling basin is 38.5 feet according to available drawings (see Figure 3 and Photographs 6, 7 and 8).

b) Outlet Conduit. The outlet works consists of a 30-inch prestressed concrete discharge conduit, a reinforced concrete vertical riser control tower, and a fish

catch basin. An intake structure consisting of a headwall and trash rack is located at the upstream toe of the embankment. The conduit was placed on a cradle and anti-seep collars were apparently provided at 25-foot intervals. The control tower is a 45-foot high reinforced concrete vertical riser. Emergency drawdown is provided by a 24-inch square sluice gate while normal flow is reportedly regulated by stop logs. A concrete fish catch basin is located at the discharge end of the outlet conduit (see Figure 5 and Photograph 5).

c. Design Data.

1. Hydrology and Hydraulics. (see Section 5.1).

2. Embankment. The embankment was designed in accordance with the guidelines set forth in "Design of Small Dams" by the Bureau of Reclamation (1960 edition). The design calculations reference this publication repeatedly.

Both the upstream and downstream slopes were analyzed for stability using the Modified Swedish Circle method. Data were available on a limited number of failure circles.

3. Appurtenant Structures. The appurtenant structures were apparently designed in accordance with the guidelines set forth in "Design of Small Dams" by the Bureau of Reclamation (1960 edition), and based on both AISC and ACI design specifications.

2.2 Construction Records.

Construction records including periodic status reports, field memoranda, and construction photographs, as compiled by Gwin Engineers, Inc., are available from PennDER files.

2.3 Operational Records.

Discussions with the owner's representative present during the inspection indicated that operational records are not kept at this facility.

2.4 Other Investigations.

No formal investigations of the facility have been performed since its completion in 1970.

## 2.5 Evaluation.

Engineering data, construction records, and miscellaneous correspondence were made available by Gwin, Dobson, and Foreman, Inc., of Altoona, Pennsylvania, and the PennDER. Sufficient data are available to indicate the structure was designed in accordance with accepted engineering practice.



### SECTION 3 VISUAL INSPECTION

#### 3.1 Observations.

a. General. The general appearance of this project indicates the dam and its appurtenances are adequately maintained, and are currently in good condition.

b. Embankment. The dam embankment is in good condition. The downstream slope is covered with crown vetch and requires little maintenance. The crest is grass covered and the upstream slope is protected by a layer of durable sandstone riprap. The embankment crest is well aligned and no appreciable settlement was detected at the time of inspection. There was no evidence of any seepage through the embankment or abutments; however, the area immediately beyond the toe and to the left of the outlet conduit was swampy. This condition was not observed at the toe to the right of the outlet conduit.

#### c. Appurtenant Structures.

1. Emergency Spillway. The emergency spillway is in good condition (see Photographs 6, 7, and 8). Some minor spalling and scaling were located along isolated areas of the spillway wingwalls. Slight vertical movement was noted at several wingwall construction joints but the movement is not considered to be a problem at this time.

2. Outlet Conduit. The only portions of the primary outlet that could be visually inspected were a portion of the vertical riser control tower and the fish catch basin. The riser tower is well maintained and in excellent condition. No signs of concrete deterioration were in evidence. All exposed metal surfaces have been painted recently (see Photograph 4). The manual gate mechanism controlling the 24 inch sluice gate is located within the riser. The gate was not operated during the inspection; however, the owner's representative indicated it was functioning properly. The stop logs located below the valve control were in place and apparently functioning properly. Minor leakage between the logs was visible.

The discharge end of the outlet conduit, including the fish catch basin is in good condition. A small amount of flow was discharging into the catch basin during the inspection. This minimal amount of water was attributed

to the visible leakage between the stop logs (see Photograph 5). The two toe drain outlets located on each side of the primary outlet were also discharging minimal flow at the time of inspection. The catch basin floor was covered with a layer of reddish-orange mud. The color of the material suggested that it was acidic in nature. Numerous coal units outcrop in the watershed area (see Appendix E "Geology"). The fish catch basin apparently no longer serves its design function due to a lack of provisions to impound water. Minor concrete deterioration and etching was visible which is likely due to the apparent corrosive nature of the discharge.

3. Reservoir Area. The area surrounding the reservoir is characterized by gentle to moderate slopes that are primarily wooded. Data contained within the designers files indicates the surrounding watershed to be 60 percent forested, 25 percent grassland, and 15 percent cultivated (see Photograph 3).

4. Downstream Channel. The area downstream of the outlet conduit and emergency spillway is a narrow grassy channel which empties into a broad floodplain approximately 200 feet downstream. Contract documents indicate the first 20 feet of this channel was to be lined with dumped riprap; however, only remnants of riprap were located at the time of inspection.

Straight Run enters the Little Mahoning Creek approximately 4 miles downstream of the dam. The first inhabited structures below the embankment are located approximately 8 miles downstream along Little Mahoning Creek. Five houses which comprise a portion of the community of Rochester Mills are located on the floodplain adjacent to the creek. It is doubtful that these residences will experience damage or that loss of life would result from a breach of Straight Run Dam; however a number of highway bridges are located at varying distances downstream of the dam which could be affected by a breach of the dam. The flood plain area from the dam to Rochester Mills is primarily undeveloped forestland. Consequently, the hazard rating for Straight Run Dam is "significant".

## SECTION 4 OPERATIONAL PROCEDURES

### 4.1 Normal Operational Procedure.

According to the owner's representative, there are no formal operational procedures at the facility. Excess inflow passes over the emergency spillway and is discharged into the stream below. The manual gate valve located within the riser is kept closed. Discharge through the outlet conduit is regulated by maneuvering the stop logs. The valve is reportedly opened several times a year to insure its operability.

### 4.2 Maintenance of Dam.

The dam is reportedly maintained on an as-needed basis. Part of the regular maintenance includes mowing the crest, clearing overgrowth, and sealing leaks between stop logs in the vertical riser.

### 4.3 Maintenance of Operating Facilities.

According to Pennsylvania Fish Commission personnel, the dam is visited frequently and maintenance is provided when the need arises. Periodic maintenance including painting exposed metal surfaces and lubricating the gate control are provided periodically, but there is no set schedule detailing the maintenance program.

### 4.4 Warning Systems.

There are no formal warning systems in effect.

### 4.5 Evaluation.

The facility as designed requires little maintenance. It is recommended, however, that formal manuals be developed in order to standardize the operating procedure. This will reduce the dependence of the facility on the judgement of its operator and allow persons who may not be familiar with the facility to operate it effectively in the event of an emergency. In addition, a formal warning system should be implemented in case emergency conditions develop.

## SECTION 5 HYDROLOGIC/HYDRAULIC EVALUATION

### 5.1 Design Data.

Available design computations indicate that the facility was designed in accordance with PennDER's "C" curve criteria (Ref: "Flood Discharge Records Relating to Pennsylvania Stream", by U. S. Department of Interior - Geological Survey, 1960 Edition, Pg. 60, Figure 4, Curve "C"). Accordingly, a dam with a drainage area of 1.49 square miles must have spillway facilities capable of discharging a flow of approximately 1960 cfs. According to the design calculations, the spillway discharges the full inflow while providing an additional 2.5 feet of freeboard above the maximum design pool. In other words, the spillway discharges the design peak inflow under a head of approximately 5 feet. The discharge at this stage (elevation 1743.5) is equivalent to approximately 2100 cfs.

### 5.2 Experience Data.

Since reservoir records are not kept at this facility, no data relative to the past performance of the dam and its outlet works are available. The general appearance of the facility would seem to indicate probable adequate past performance.

### 5.3 Visual Observations.

On the date of the inspection, no conditions were observed that would indicate the appurtenant structures of the dam could not operate satisfactorily during a flood event.

### 5.4 Overtopping Potential.

The ratio "PMF Peak Flow/Drainage Area" was determined from an empirical curve supplied by the Corps of Engineers, Baltimore District. The curve used was the Ohio River Basin Curve. Based on this curve and a drainage area 1.49 square miles, Peak PMF  $Q/A = 1950$  cfs/sq. mi., and Peak PMF  $Q = 2906$  cfs. The size category is "intermediate" and the hazard rating "significant". Consequently, the required SDF is  $1/2$  PMF to PMF.



Calculations were performed to evaluate the overtopping potential using spillway and storage capacities during the PMF event.

The spillway has a maximum discharge capacity equivalent to 3882 cfs. A comparison of peak inflow (Peak PMF  $Q = 2906$  cfs) with maximum discharge shows the discharge capacity to be greater than the peak inflow resulting from the PMF. Consequently, the spillway is capable of handling the PMF without being overtopped.

#### 5.5 Spillway Adequacy.

The spillway is deemed adequate in that the facility will pass and/or contain the PMF.

## SECTION 6 EVALUATION OF STRUCTURAL INTEGRITY

### 6.1 Visual Observations.

a. Embankment. Based on visual observations, the embankment appeared to be in good structural condition. No areas of seepage were found along the embankment face or at the abutments. The area just beyond the toe and left of the outlet conduit is swampy. This condition is likely due to a lack of positive drainage away from the embankment toe.

b. Appurtenant Structures. The visual inspection served to confirm what appears to be a sound structural design of the appurtenances. Outward movement already evident at the vertical spillway wingwalls (see Photograph 8) should be monitored so that corrective measures can be implemented quickly if required. The deposit of reddish-brown mud in the discharge basin of the outlet conduit could conceivably indicate some influx of embankment fines through cracks or joints in the conduit.

### 6.2 Design and Construction Techniques.

The design drawings and calculations obtained from PennDER files indicate the facility has been adequately designed in conformance with modern accepted engineering practice.

Project specifications and drawings along with construction photographs suggest that the structure is adequate in both concept and construction.

### 6.3 Past Performance.

The facility has reportedly functioned as designed with the exception of the seepage problems which required remedial grouting, shortly after construction.

### 6.4 Seismic Stability.

The dam is located within Seismic Zone No. 1, and it is thought that the static stability is sufficient to withstand minor earthquake induced dynamic forces. However, no calculations, investigations, etc., were performed to confirm this belief.

SECTION 7  
ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The visual inspection, operational history, and available engineering data suggest that the facility is well maintained and in good condition.

Hydraulic and hydrologic calculations indicate that the spillway is capable of passing and/or storing the flow resulting from a storm of PMF intensity; therefore, the spillway is considered adequate.

b. Adequacy of Information. The available data are considered sufficient to make an accurate assessment of the facility.

c. Urgency. It is suggested that the recommendations listed below be implemented as soon as practical.

d. Necessity for Additional Investigations. No additional investigations are deemed necessary at this time.

7.2 Recommendations/Remedial Measures.

It is recommended that:

a. A formal warning system be developed to ensure the safe evacuation of all inhabitants immediately downstream should the need arise.

b. The owner develop a manual for the operation and maintenance of the outlet works at the facility.

c. The owner provide positive drainage away from the embankment to relieve the swampy condition beyond the toe.

d. The owner patch, repair, and seal those areas in the spillway exhibiting minor concrete deterioration.

e. The facility be inspected on an annual basis to check for deleterious conditions which might develop. The outlet conduit should be inspected for cracks or joint openings which would permit the influx of embankment fines.

**APPENDIX A**

**CHECK LIST - VISUAL INSPECTION**



CHECK LIST  
VISUAL INSPECTION  
PHASE 1

DAM NAME Straight Run Dam COUNTY Indiana STATE PA ID # PA-283  
PennDer 32-76

TYPE OF DAM earth HAZARD CATEGORY significant

DATE(S) INSPECTION 7-14-78 WEATHER sunny & humid TEMPERATURE 80°-85°

POOL ELEVATION AT TIME OF INSPECTION 1737.5 M.S.L. TAILWATER AT TIME OF INSPECTION -- M.S.L.

INSPECTION PERSONNEL:

B. M. Mihalcin (GAI) Harry Sebring (PA Fish Commission)  
J. P. Nairn (GAI) \_\_\_\_\_  
D. L. Bonk (GAI) \_\_\_\_\_

D. L. Bonk \_\_\_\_\_ RECORDER

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## VISUAL EXAMINATION OF

## OBSERVATIONS

## SURFACE CRACKS

None observed.

UNUSUAL MOVEMENT OR  
CRACKING AT OR BEYOND  
THE TOE

None observed.

SLOUGHING OR EROSION OF  
EMBANKMENT AND ABUTMENT  
SLOPES

None observed.

VERTICAL AND HORIZONTAL  
ALIGNMENT OF THE CREST

Good.

## RIPRAP FAILURES

None observed. Riprap appears to consist of durable sandstone.

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VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Good condition.	
ANY NOTICEABLE SEEPAGE	No seepage noted through the embankment. A swampy area is located beyond the toe and to the left of the outlet conduit.	
STAFF GAGE AND RECORDER	None observed.	
DRAINS	Two toe drains are discharging into the outlet basin at the toe. Drains are located adjacent to the outlet conduit on each side (discharge << 1 gpm).	

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VISUAL EXAMINATION OF

CRACKING AND SPALLING OF  
CONCRETE SURFACES IN  
OUTLET CONDUIT

Minor deterioration of the outlet channel is visible and most likely due to the apparent chemical nature of the discharge. Other concrete surfaces are in good condition.

INTAKE STRUCTURE

Box-shaped concrete vertical tower. Manually operated gate valve and control are contained inside and used to drawdown the reservoir. Wooden stop logs are used to regulate normal flow. Tower is in good condition. All metal surfaces have been recently painted.

OUTLET STRUCTURE

Good condition.

OUTLET CHANNEL

A 40-foot long by 20-foot wide concrete fish catch was apparently designed to contain those fish that managed to travel through the outlet works. A series of stop logs were apparently placed at the discharge end of the basin to allow water to backup and become impounded. No logs were in place during the inspection. Without the logs, the fish catch basin cannot perform its design function. Beyond the basin is a natural channel with moderate slopes that are heavily wooded.

EMERGENCY GATE

A 24-inch manually operated gate valve is located at the base of the vertical riser tower. The gate control is located within the tower. It is anchored to a concrete ledge directly beneath the top hatch opening. The gate control appears to be in good condition.



VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

CONCRETE WEIR

50 feet long ogee-shaped weir with sloping approach. Good condition with no signs of deterioration. Depth of forebay is 2.5 feet.

APPROACH CHANNEL

Curved natural channel with a dumped riprap floor.

DISCHARGE CHANNEL

Wide flat valley approximately 100 yards beyond the embankment.

BRIDGE AND PIERS

None observed.

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VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	Small, broad-crested, low discharge measuring weir located at end wall of stilling basin.	
PIEZOMETERS	None observed.	
OTHERS		

MONUMENTATION/SURVEYS

None observed.

OBSERVATION WELLS

None observed.

WEIRS

Small, broad-crested, low discharge measuring weir located at end wall of stilling basin.

PIEZOMETERS

None observed.

OTHERS

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VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

SLOPES

Steep slopes at left and right abutments. Slopes upstream of dam are gentle to moderate and contain several areas that have been cleared for recreational uses.

SEDIMENTATION

None observed.

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VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

CONDITION  
(CESTRUCTIONS,  
DEBRIS, ETC.)

Unobstructed channel.

SLOPES

Natural channel with moderate slopes that are heavily wooded leads into a broad grassy floodplain approximately 100 yards beyond the embankment.

APPROXIMATE NO.  
OF HOMES AND  
POPULATION

Five residences which comprise a portion of the community of Rochester Mills located approximately 8 miles downstream are sufficiently near the floodplain to possibly be affected by an embankment breach; however, because of the distance involved it is doubtful that lives will be lost. Population = 20 persons.

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**APPENDIX B**

**CHECK LIST - ENGINEERING DATA**

CHECK LIST	NAME OF DAM	Straight Run Dam
	ENGINEERING DATA	NDI# PA-283
	DESIGN, CONSTRUCTION, OPERATION PHASE I	ID # PENNDER 32-76
ITEM	REMARKS	SHEET 1

AS-BUILT DRAWINGS

Drawings available are not marked "as-built" (see Appendix F).

REGIONAL VICINITY MAP

See Appendix G.

CONSTRUCTION HISTORY

Periodic construction status reports along with construction photographs and memoranda are available from PENNDER files.

TYPICAL SECTIONS OF DAM

See Figure 4.

OUTLETS - PLAN

See Figure 5.

- DETAILS

See Figures 5 and 6.

- DISCHARGE RATINGS

None available.

RAINFALL/RESERVOIR RECORDS

Not available.

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ITEM	REMARKS	ID #	PA-283	SHEET 2
------	---------	------	--------	---------

DESIGN REPORTS

Not available.

GEOLGY REPORTS

Geological information is available from the files of Gwin, Dobson, and Forman, Inc., of Altoona, Pennsylvania (not a formal report).

DESIGN COMPUTATIONS  
HYDROLOGY & HYDRAULICS  
DAM STABILITY  
SEEPAGE STUDIES

Available from the files of Gwin, Dobson, and Foreman, Inc.

MATERIALS INVESTIGATIONS  
BORING RECORDS  
LABORATORY  
FIELD

Available from the files of Gwin, Dobson, and Foreman, Inc.

POST-CONSTRUCTION SURVEYS OF DAM

None.

BORROW SOURCES

See Figure 1.

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MONITORING SYSTEMS

None.

MODIFICATIONS

Post construction grouting performed by F. T. Kitlinski and Associates, of Harrisburg, Pennsylvania. No formal reports are available. A limited amount of information is contained within PennDER files.

HIGH POOL RECORDS

Not available.

POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS

Not available.

PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS

Not available.

MAINTENANCE OPERATION RECORDS

Not available.

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ITEM	REMARKS	ID #	PA-283	SHEET 4
SPILLWAY PLAN	See Figure 3.			
SECTIONS	See Figure 3.			
DETAILS	See Figure 3.			
OPERATING EQUIPMENT PLANS & DETAILS	See Figures 5 and 6.			

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CHECK LIST      ID # NDI# PA-283  
HYDROLOGIC AND HYDRAULIC      PennDER 32-76  
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 1.49 square miles.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1738.5 (900 acre-feet).

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): Not known.

ELEVATION MAXIMUM DESIGN POOL: 1743.5 (1220 acre-feet).

ELEVATION TOP DAM: 1746.5.

SPILLWAY DATA:

- a. Crest Elevation 1738.5.
- b. Type Concrete open-channel with an ogee-shaped weir.
- c. Weir Length 50 feet.
- d. Channel Length 200 feet.
- e. Location Spillover Right abutment.
- f. Number and Type of Gates None.

OUTLET WORKS:

- a. Type 30-inch concrete outlet pipe and vertical riser.
- b. Location near the center of the embankment.
- c. Entrance Inverts 1703 feet.
- d. Exit Inverts 1701.7.
- e. Emergency Draindown Facilities 24-inch sluice gate at the base of the riser controlling flow in 30-inch outlet pipe.

HYDROMETEOROLOGICAL GAGES:

- a. Type None.
- b. Location -
- c. Records -

MAXIMUM NON-DAMAGING DISCHARGE: Not known.

APPENDIX C  
HYDROLOGY AND HYDRAULICS

SUBJECT DAM SAFETY INSPECTION  
STRAIGHT RUN DAM  
BY DLB DATE 8-14-78 PROJ. NO. 78-501-283  
CHKD. BY JTS DATE 8-22-78 SHEET NO. 1 OF 3



### DAM STATISTICS

MAXIMUM HEIGHT - 45 FEET (REF 1, pg 1)  
DRAINAGE AREA - 1.49 SQUARE MILES " "  
STORAGE CAPACITY - 900 AC-FT " "

### SIZE CLASSIFICATION

DAM SIZE - INTERMEDIATE (REF 2, TABLE 1)  
HAZARD RATING - SIGNIFICANT (REF 2, TABLE 2 ; BASED ON FIELD OBSERVATIONS)  
REQUIRED SDF - 1/2 PMF TO PMF (REF 2, TABLE 3)

### REFERENCES

- 1: "REPORT UPON THE APPLICATION OF THE PENNSYLVANIA FISH COMMISSION"  
PENNDER, MAY 28, 1969
- 2: "RECOMMENDED GUIDELINES FOR SAFETY INSPECTION OF DAMS"  
DEPT. OF THE ARMY - OFFICE OF CHIEF ENGINEER, APPENDIX D
- 3: "STANDARD HANDBOOK FOR CIVIL ENGINEERS"  
F.S. MERRITT, MCGRAW-HILL 1976

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SUBJECT DAM SAFETY INSPECTION  
STRAIGHT RUN DAM  
 BY DLB DATE 8-14-78 PROJ. NO. 78-501-283  
 CHKD. BY JTS DATE 8-22-78 SHEET NO. 2 OF 3

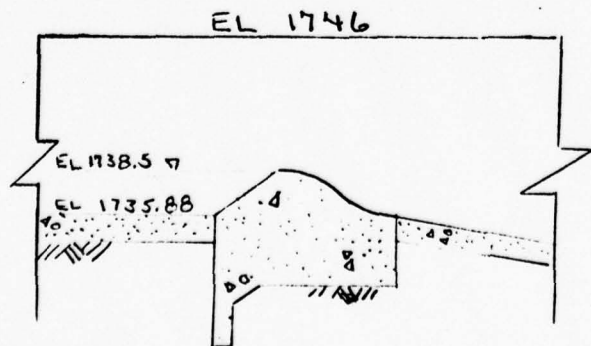
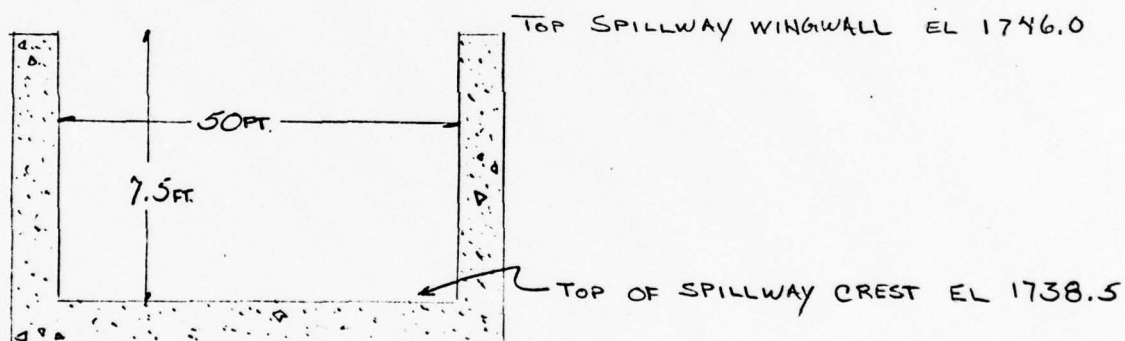
**gai**  
 CONSULTANTS, INC.  
 Engineers • Geologists • Planners  
 Environmental Specialists

PMF (PEAK FLOW) / AREA = 1950 CFS / SQ. MI. (REF: COF E CURVE,  
 OHIO RIVER BASIN)

PMF = (1950 CFS / SQ. MI.) (1.49 SQ. MI.) = 2906 CFS

∴ PEAK PMF Q = 2906 CFS

### SPILLWAY CAPACITY



NOTE: ALL DIMENSIONS AND ELEVATIONS HAVE BEEN TAKEN FROM DRAWINGS BY GWIN ENGINEERS, INC. OF ALTOONA, PENNSYLVANIA (SHEET 11). DIMENSIONS HAVE BEEN FIELD VERIFIED.

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SUBJECT

DAM SAFETY INSPECTIONSTRAIGHT RUN DAMBY DLB

DATE

8-14-78

PROJ. NO.

78-501-283CHKD. BY JTS

DATE

8-22-78

SHEET NO.

3 OF 3Engineers • Geologists • Planners  
Environmental Specialists

$$Q = C L H^{3/2} = \text{MAXIMUM DISCHARGE}$$

(REF 3, EQ 21-121)

(FROM FIG. 21-69, REF 3)

$$\text{UPSTREAM SLOPE OF WEIR} = 45^\circ$$

$$P/H_D = 2.62/7.5' = 0.35$$

$$\frac{C_{\text{INCLINED}}}{C_{\text{VERTICAL}}} = 1.022$$

(FROM FIG. 21-67, REF 3)

$$C_{\text{VERTICAL}} = 3.7$$

$$C_{\text{INCLINED}} = 3.7(1.022) = 3.78$$

$$L = \text{WEIR LENGTH} = 50 \text{ FT (SHEET 2)}$$

$$H = \text{HEIGHT OF WINGWALL ABOVE SPILLWAY CREST} = 7.5 \text{ FT (SHEET 2)}$$

$$Q = (3.78)(50)(7.5)^{3/2} = 3882 \text{ CFS}$$

$$\text{MAXIMUM DISCHARGE (3882 CFS)} > \text{PEAK INFLOW (2906 CFS)}$$

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**APPENDIX D**  
**PHOTOGRAPHS**

PHOTOGRAPH 1 View of Straight Run Dam taken from the left abutment. The spillway can be seen in the background of the photograph.

PHOTOGRAPH 2 View of Straight Run Dam, taken from the right abutment, showing the downstream face.

PHOTOGRAPH 3 View of the wooded, gentle to moderate slopes surrounding the reservoir.

PHOTOGRAPH 4 View of the gate valve on the outlet works of Straight Run Dam.





4

2



3



1



PHOTOGRAPH 5

View of the discharge end of the 30-inch diameter outlet pipe at Straight Run Dam.

PHOTOGRAPH 6

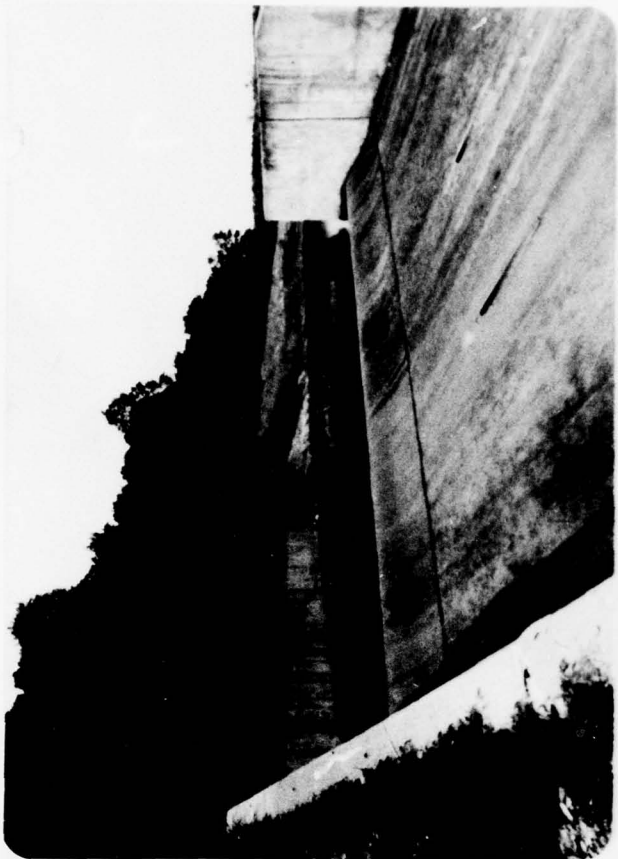
View of the ogee-crested weir spillway located at the right abutment.

PHOTOGRAPH 7

View of the spillway outlet channel showing the chute block and dentated sills at the spillway plunge pool.

PHOTOGRAPH 8

View looking up at the spillway endwalls. Note the large crack (2 inches wide) that has developed on the right spillway endwall.



6



8



5



7

APPENDIX E

GEOLOGY



## GEOLOGY

The Straight Run Dam and Reservoir is located within the Allegheny Plateau Physiographic Province. Alluvial soils occur within the flood plain of Straight Run, however the bulk of the soils within the reservoir and watershed are residual. The residual soils are generally medium to coarse textured, moderate to well drained and are chiefly residual products of sandstone and to a lesser extent shale and siltstone. Thicknesses of these soils are normally 6 feet or less. The alluvial soils measured in excess of 25 feet at the site of the dam (see Figure 7).

Bedrock within the dam's watershed consists mainly of the Allegheny Group of Pennsylvanian age. Rock strata from the middle Kittanning coal to the base of the Allegheny Group occur beneath the dam and reservoir. A small portion of the upper Allegheny Group and the overlying Pennsylvanian age Conemaugh Group occur in the western area of the watershed.

Structurally the site is located on the west flank of the Chestnut Ridge anticline. The crest of the anticline is quite broad at this point and the rock strata are nearly flat. Locally the bedding dips gently to the southwest.

Evidence of coal mining within the dam's drainage area is very limited. The lower and upper Freeport coal seams have been strip mined west of the watershed of the dam and a strip mine in the upper Freeport seam occurs near Route 336

at the eastern boundary of the watershed. The middle and lower Kittanning coal seams in addition to the Clarion and Brookville seams exist beneath the dam and reservoir but are not believed to be mined.

**APPENDIX F**

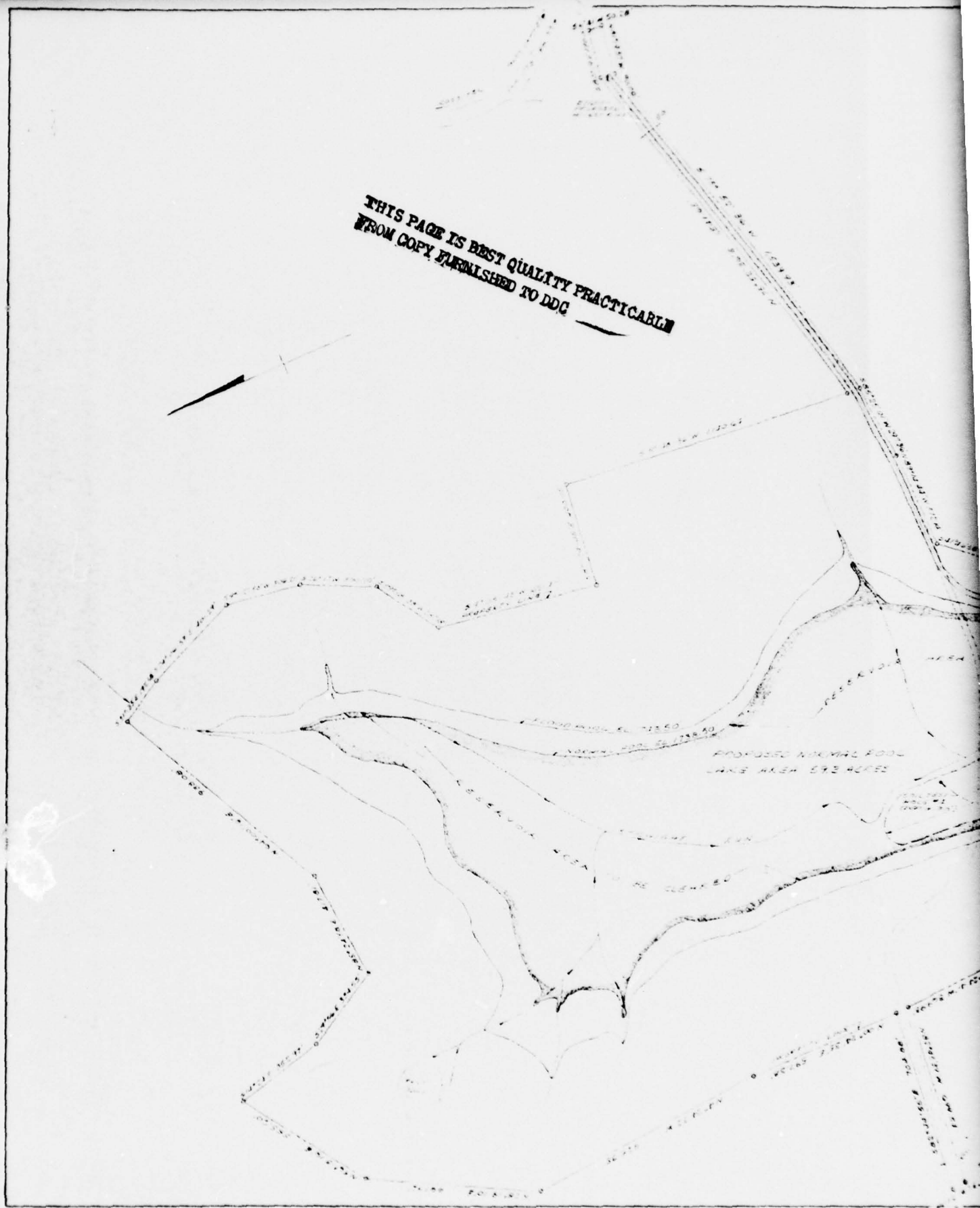
**FIGURES**

## LIST OF FIGURES

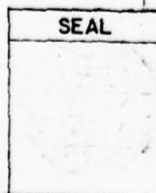
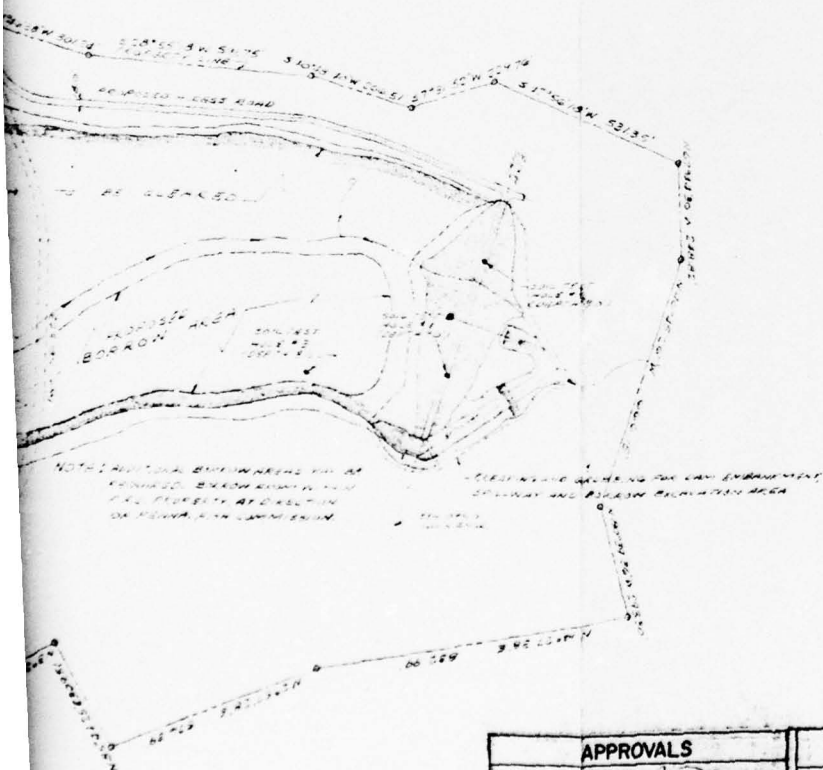
<u>Figure</u>	<u>Description/Titles</u>
1	General Site Plan
2	Site Plan of Dam Embankment and Related Facilities
3	Plan and Profile of Proposed Spillway
4	Dam Embankment - Cross Sections
5	Plan and Profile of Proposed Outlet Works
6	Control Tower
7	Location of Holes for Core Drilling



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APPROVALS			
APPROVED:	<i>[Signature]</i>		
EXEC. DIRECTOR - PENNSYLVANIA FISH COMMISSION			
APPROVAL RECOMMENDED:	<i>[Signature]</i>		
ENGINEERING DIVISION CHIEF ENGINEER			
SUBMITTED BY:			
CONSULTING ENGINEER			
BY:			
RECEIVED BY:			
CONTRACTOR			
BY:			
DRAWN BY:	DATE:	CHECKED BY:	DATE:

PROJECT NO. F.C. 191L (395-2)	
GENERAL SITE PLAN	
PROPOSED STRAIGHT RUN DAM AND RELATED FACILITIES BANKS TOWNSHIP, INDIANA COUNTY PENNSYLVANIA	
DWM ENGINEERS, INC. CONSULTING ENGINEERS ALTOONA, PENNA.	
SCALE: 1" = 200'	COMMONWEALTH OF PENNSYLVANIA RAYMOND P. SHAFER GOVERNOR PENNSYLVANIA FISH COMMISSION HERBERT J. BELO EXEC. DIRECTOR HARRISBURG, PENNSYLVANIA
SHEET NO. 2	

FIGURE 1

RESEARVOR

EXISTING SAND  
CONTROL

68° 49' 22.5" —

H.M. - LONG SAND  
WIND 30-40  
SP. 24 2-150  
SL - 780.50  
(FALL 2000)  
28 - 12.35

EXISTING GROUND  
CONTOURS

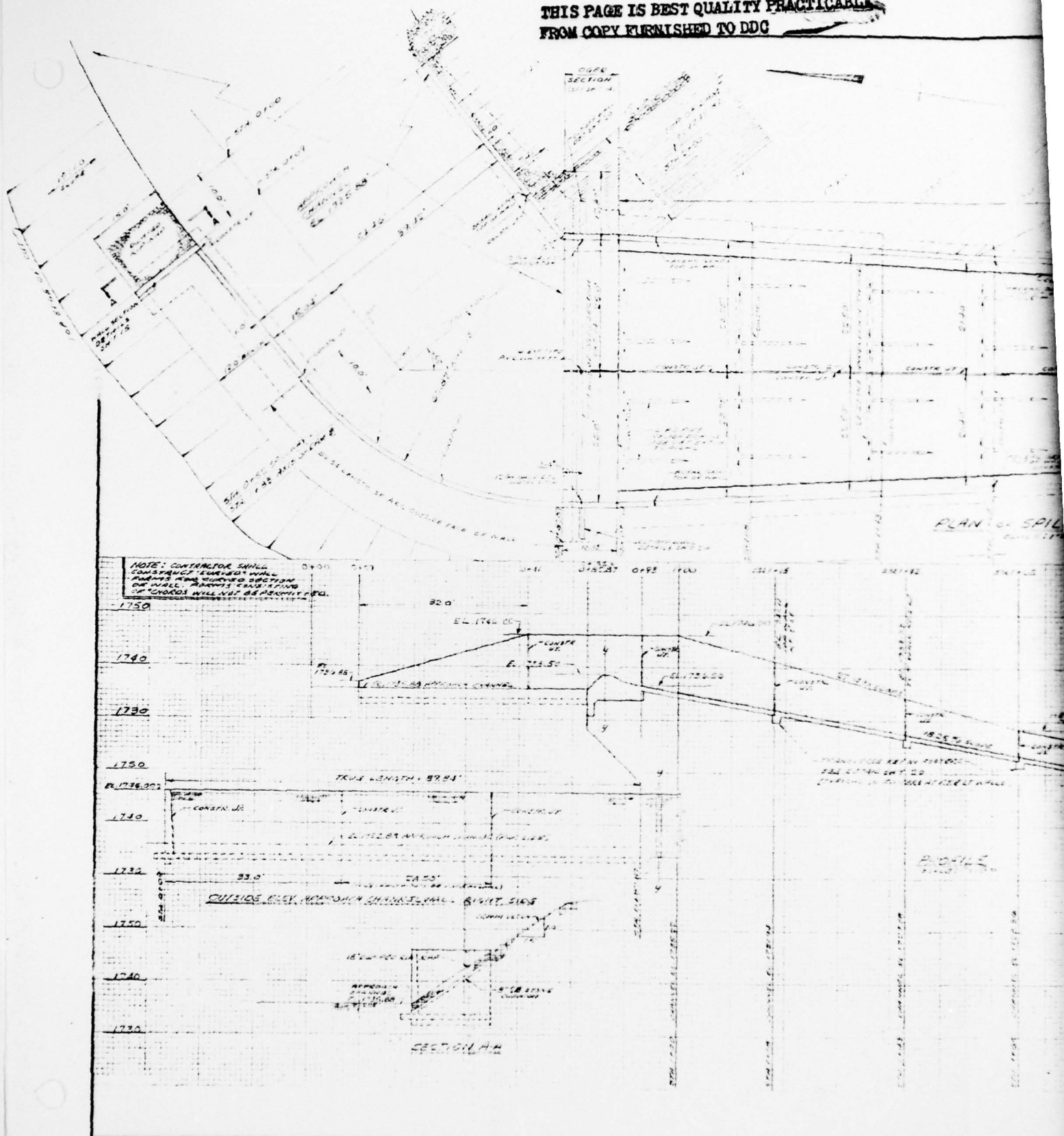
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SEAL	APPROVALS				PROJECT NO. FC. 191L (395-2)	
	APPROVED: EXEC. DIRECTOR, PENNSYLVANIA FISH COMMISSION				SITE PLAN & DAM EMBANKMENT AND RELATED FACILITIES	
	APPROVAL RECOMMENDED: ENGINEERING DIVISION CHIEF ENGINEER				PROPOSED STRAIGHT RUN DAM AND RELATED FACILITIES	
	SUBMITTED BY: CONSULTING ENGINEER				BANKS TOWNSHIP, INDIANA COUNTY PENNSYLVANIA	
	BY:				LWA ENGINEERS, INC. CONSULTING ENGINEERS ALTOONA, PENNA.	
SEAL	ACCEPTED BY: CONTRACTOR				SCALE	SHEET NO. 3
	BY:				COMMONWEALTH OF PENNSYLVANIA RAYMOND P. SHAFER, GOVERNOR PENNSYLVANIA FISH COMMISSION ROBERT J. REED, EXEC. DIRECTOR HARRISBURG, PENNSYLVANIA	
	DESIGNED BY	DATE	CHECKED BY	DATE		

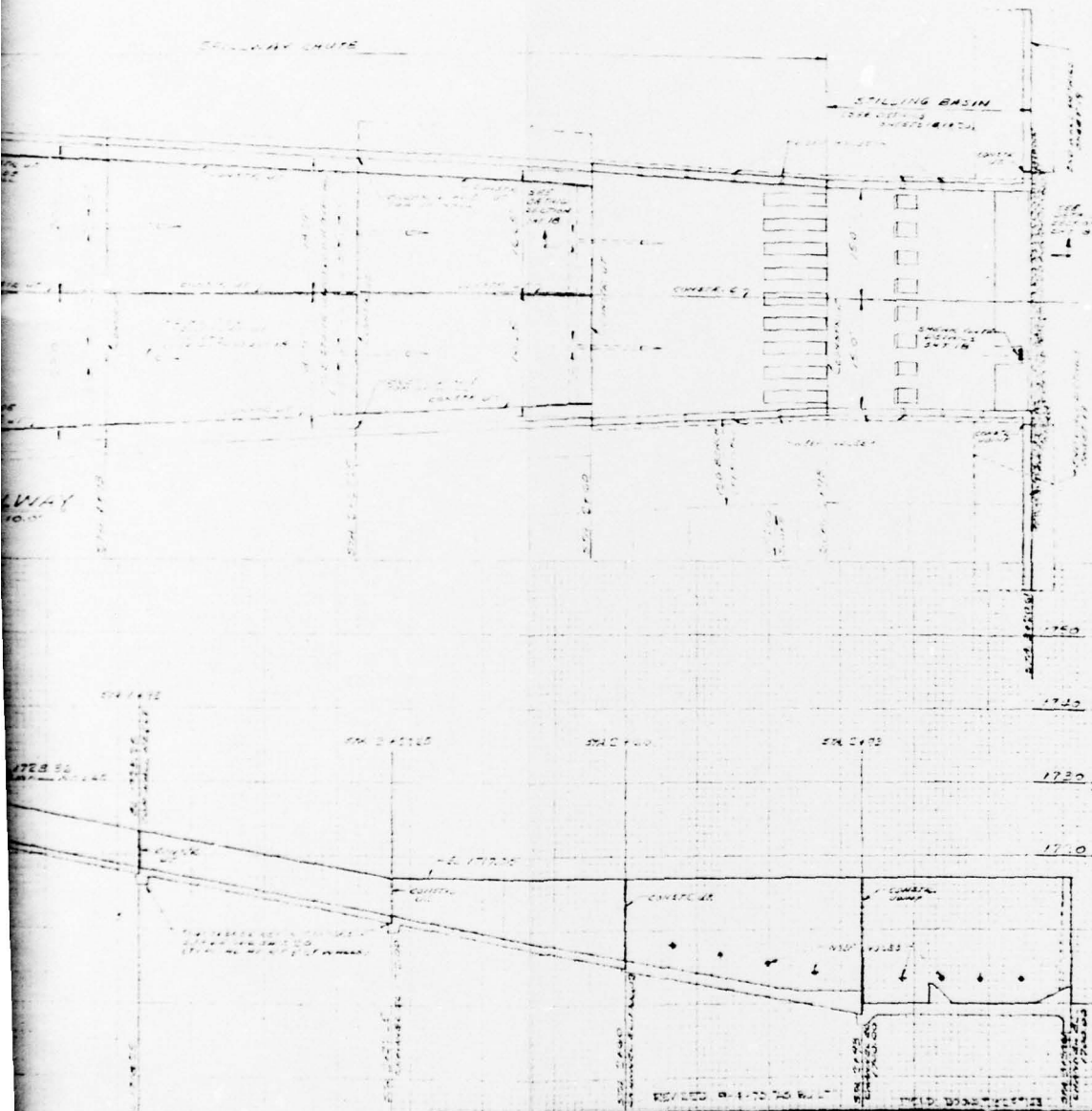
FIGURE 2



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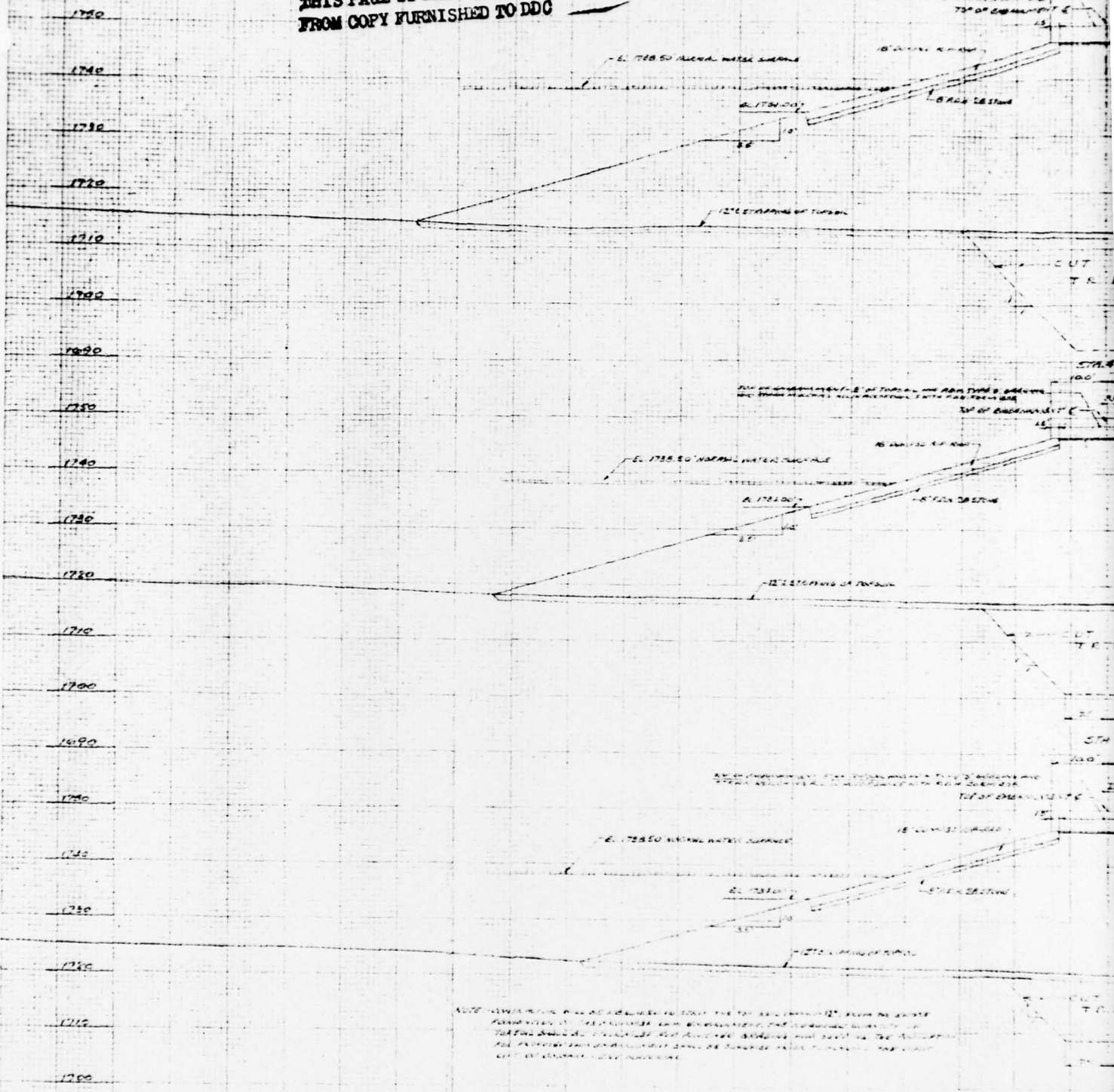
<b>SEAL</b> 	<b>APPROVALS</b> APPROVED: <i>[Signature]</i> EXEC. DIRECTOR: PENNSYLVANIA FISH COMMISSION APPROVAL: RECOMMENDED BY: <i>[Signature]</i> R. M. M. A. ENGINEERING DIVISION: CHIEF ENGINEER SUBMITTED BY: CONSULTING ENGINEER BY: <i>[Signature]</i> ACCEPTED BY: CONTRACTOR BY: <i>[Signature]</i> DRAWN BY: C. P. H. DATE: 5-5-69 CHECKED BY: R. M. A. DATE: 5-6-69		<b>PROJECT NO. EC. 191L (395-2)</b> <b>PLAN AND PROFILE</b> <b>PROPOSED SPILLWAY</b> <b>PROPOSED STRAIGHT RUN DAM</b> AND RELATED FACILITIES BANKS TOWNSHIP, INDIANA COUNTY PENNSYLVANIA OWEN BRIDGES, INC. CONSULTING ENGINEERS ALTOONA, PENNA.	
	SCALE: 1"=10' COMMONWEALTH OF PENNSYLVANIA RAYMOND S. SHAFER GOVERNOR PENNSYLVANIA FISH COMMISSION ROBERT J. BELO EXEC. DIRECTOR HARRISBURG, PENNSYLVANIA		SHEET NO. <b>11</b>	

FIGURE 3

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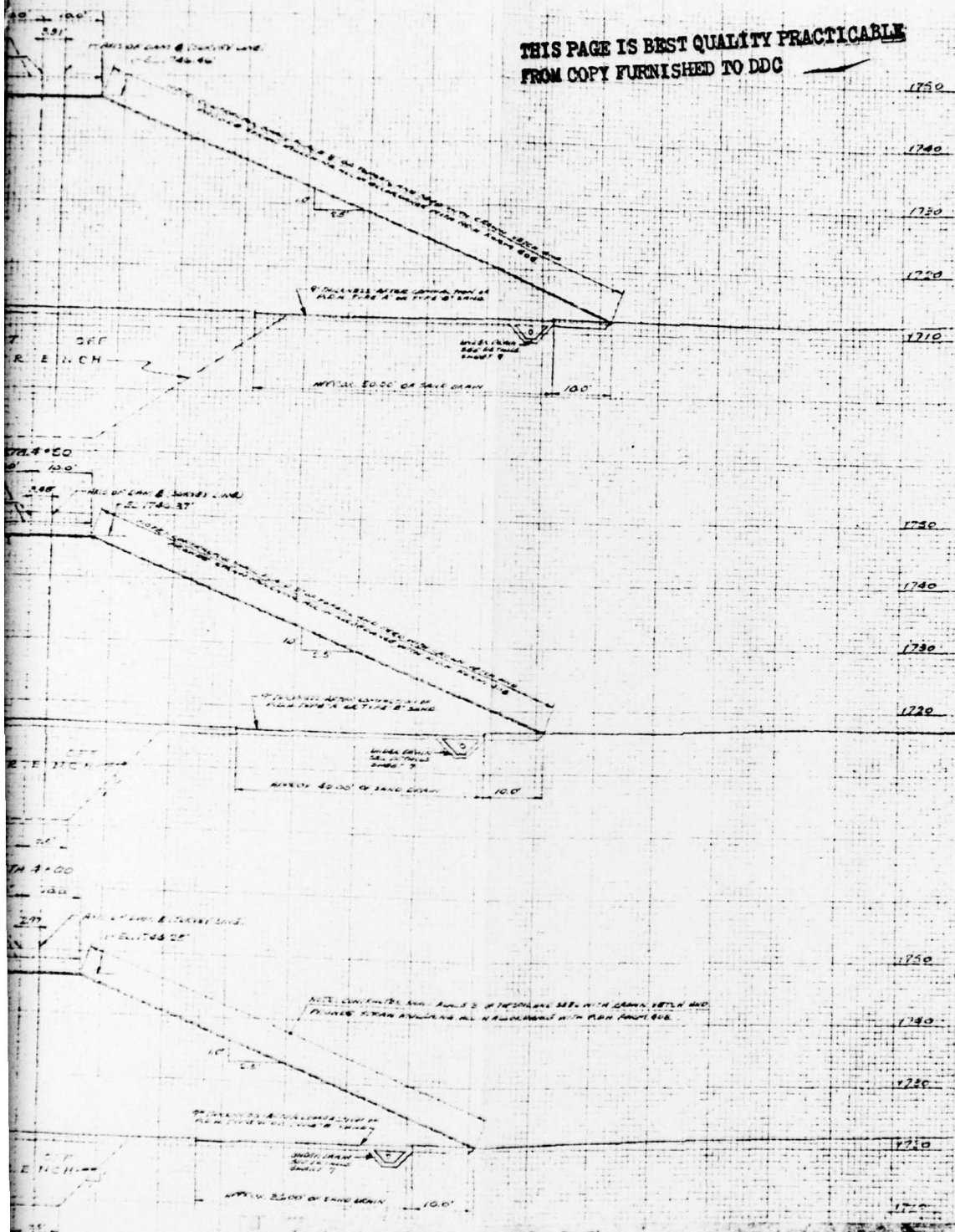
PLAN OF EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD  
AND 15' OF EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD



NOTE: EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD  
AND 15' OF EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD  
TUNNEL AND ADJACENT ROAD AND 15' OF EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD  
FOR PROPOSED EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD AND 15' OF EMBANKMENT 12' OF TUNNEL AND ADJACENT ROAD



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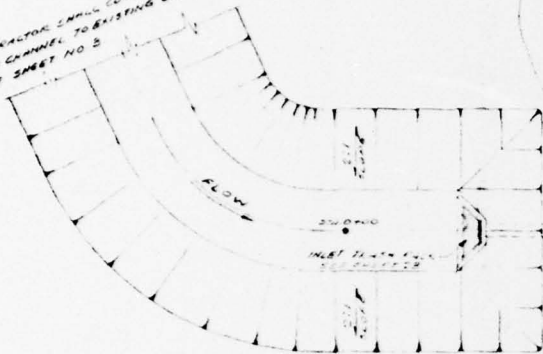
<b>SEAL</b> 		<b>APPROVALS</b> APPROVED: _____ EXEC. DIRECTOR, PENNSYLVANIA FISH COMMISSION APPROVAL RECOMMENDED: <u>10/10/10</u> ENGINEERING DIVISION CHIEF ENGINEER SUBMITTED BY: _____ CONSULTING ENGINEER ACCEPTED BY: _____ CONTRACTOR DRAWN BY: _____ DATE: _____ CHECKED BY: _____ DATE: _____		<b>PROJECT NO. EC. 191L (395-2)</b> <b>DAM EMBANKMENT - CROSS SECTIONS</b> <b>PROPOSED STRAIGHT RUN DAM</b> AND RELATED FACILITIES BANKS TOWNSHIP, INDIANA COUNTY PENNSYLVANIA GHD ENGINEERS, INC. CONSULTING ENGINEERS ALTOONA, PENNA. COMMONWEALTH OF PENNSYLVANIA RAYMOND P. SHAFER - GOVERNOR PENNSYLVANIA FISH COMMISSION ROBERT J. BIELLO - EXEC. DIRECTOR HARRISBURG, PENNSYLVANIA SCALE: 1"=10' SHEET NO. 6	
		REVISION: 9-2-10 FAS BUILT			

FIGURE 4

2

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CONTRACTOR SHALL CONSTRUCT AND GRADE  
NEW CHANNEL TO EXISTING STREAM BED  
SEE SHEET NO. 3



PLAN OF OUTLET WORKS  
SCALE: 1"=50'

NOTE: CONTRACTOR SHALL PROVIDE 25' OF  
LIFTING TO LOWEST ROAD TO BE  
CONSTRUCTED. CONTRACTOR SHALL  
CONSTRUCT CHANNEL TO EXISTING  
STREAM BED TO EXISTING STREAM BED  
AND TO EXISTING STREAM BED  
AND TO EXISTING STREAM BED

CONTRACTOR SHALL CONSTRUCT  
NINE (9) FEET LONG WITH 25' DEEP  
PIPE COLLARS. SEE SHEET 3.

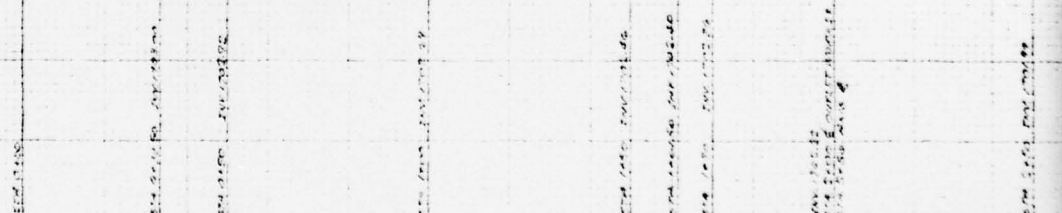
SPECIAL WATER SURFACE E. 1739.50

125 LINEAL FEET EXTEND TO REINFORCED CONCRETE PIPE

144 LINEAL FEET ESTIMATED PRELIMINARY

PROFILE  
ELEVATION 1720  
VERT. 1"=20'

NOTE: CONTRACTOR IS CAUTIONED TO  
BE AWARE OF THE FACT THAT THE  
PIPE SHALL BE INSTALLED TO THE  
TWO FEET FROM THE TOP OF THE





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CONTRACTOR SHALL CONSTRUCT AND GRADE  
NEW CHANNEL TO EXISTING STREAM BED  
SEE SHEET NO. 2

AND GRADIENT AS SHOWN, NEARLY TO CENTER LINE OF  
STREAM CONSTRUCTION WITH FISHING AND HANDS SHALL BE  
SIGNING TO THE VERTICAL (1:500)

NOTE: CUTTING EDGE SHALL BE GRAVITATED AND FASTENED TO  
POUNDING SIDE OF EXISTING BRIDGE PIER TO CONSTRUCTION  
PROPOSED 30 INCH CONCRETE

30 INCH CONCRETE PIAS

TO MAINTAIN THIS BRIDGE PIER ALIGNED WITH THE CENTER OF THE PROPOSED CIVIL CONSTRUCTION  
PIERCE SHALL BE GRADED WITH AN UNDISTURBED SURFACE. IF THE GRADE IS SHOWN OVERLAPPING,  
OR WHERE THE BRIDGE PIER IS IN A LINE UNDISTURBED BEING TO THE CENTER OF THE CENTER  
PIERCE EXPENSE AND AT THE SAME TIME TO THE BRIDGE.

REVISION 11-4-11 AS SHOWN

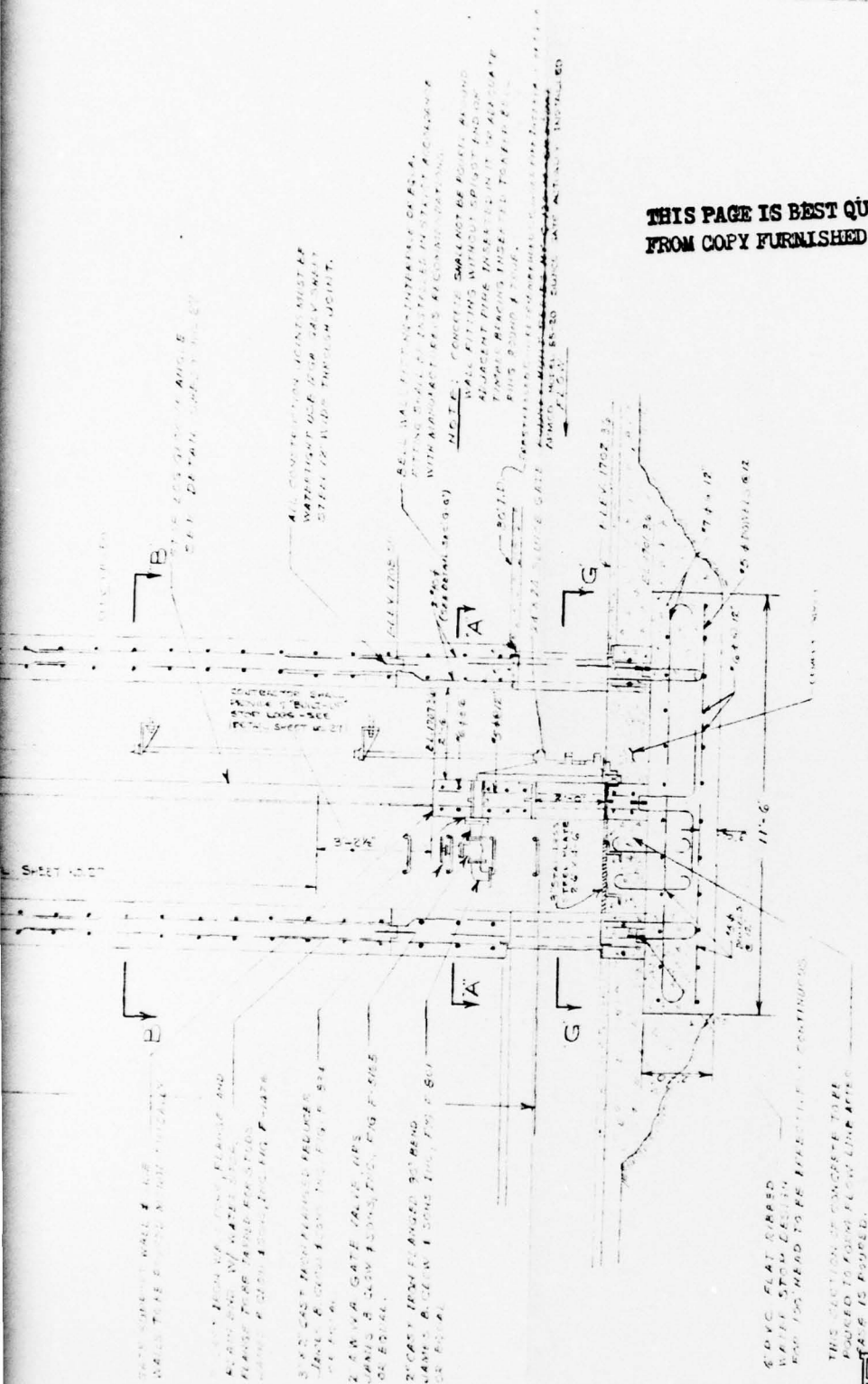
	<b>APPROVALS</b> APPROVED: <i>[Signature]</i> EXEC. DIRECTOR, PENNSYLVANIA FISH COMMISSION APPROVAL, RECOMMENDED: <i>[Signature]</i> ENGINEERING, PENNSYLVANIA FISH COMMISSION SUBMITTED BY: CONSULTING ENGINEER BY: <i>[Signature]</i> ACCEPTED BY: CONTRACTOR BY: <i>[Signature]</i>		<b>PROJECT NO. EC-1911 (395-2)</b> <b>PLAN</b> <b>PROPOSED STRAIGHTENING</b> AND RELATED WORK BANKS, YOUNG, PENNSYLVANIA PENNSYLVANIA CONSTRUCTION, INC. CONSULTING ENGINEER ALTOONA, PENNA.
	<b>SCALE:</b> 1" = 20'		
	COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENT & NATURE PENNSYLVANIA FISH COMMISSION ROBERT A. HELD, ENGINEER		
	DRAWN BY: <i>[Signature]</i> DATE: 5-9-69 CHECKED BY: <i>[Signature]</i> DATE: 5-9-69		

FIGURE 5

OWN SHEET THE JOB NO. 118159



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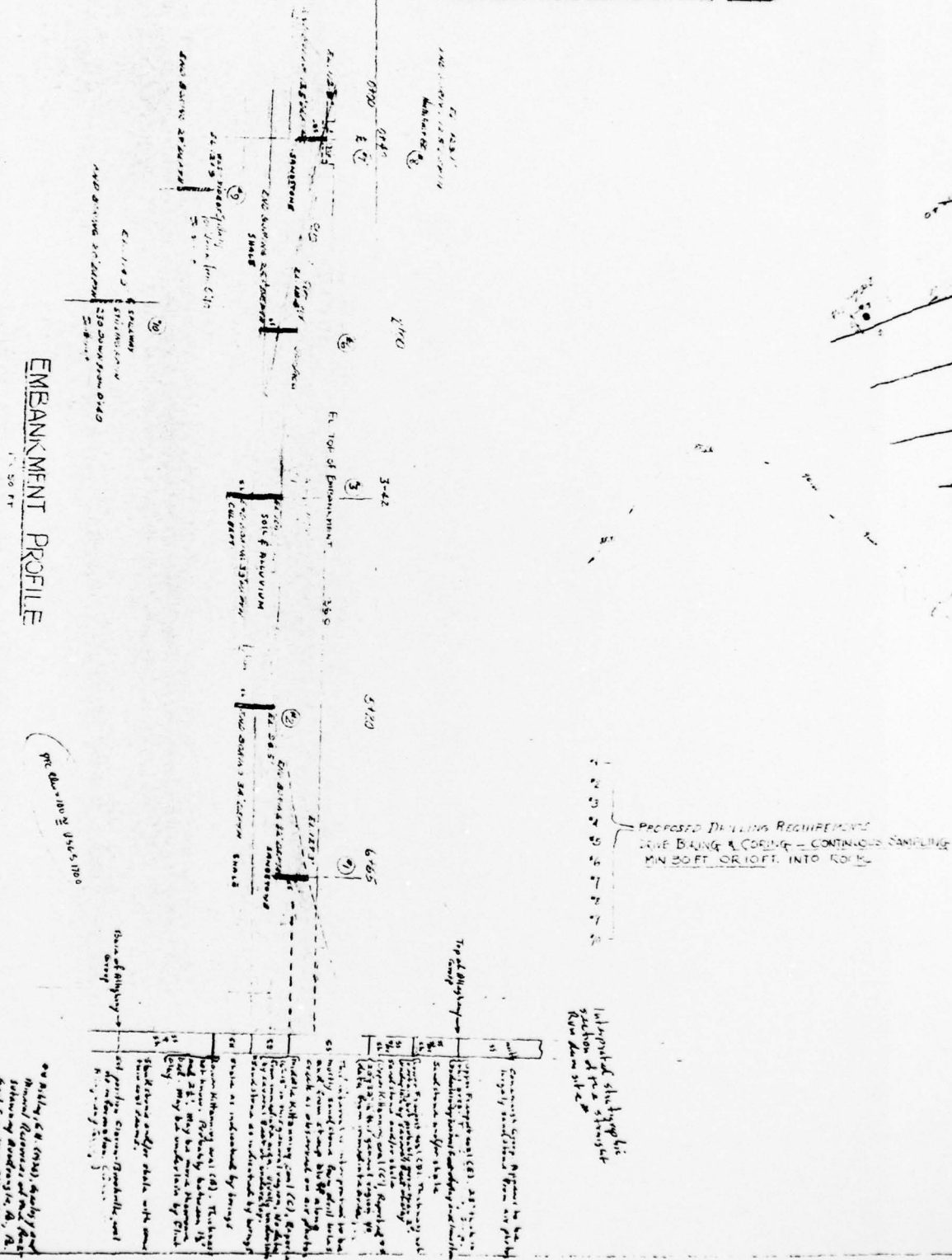
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GENERAL ANALYTICAL INC.

[illegible]

FIGURE 6

2

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At Passaic on attached borings, the Geology and Mineral Resources of the Passaic County Geological, and annotation at 1877 aerial photographs. No fluid channels

W.H. Adams  
Jan 1966



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Thickness of alluvium and  
soil in feet (= depth to  
bedrock) — 20'

LOCATION OF HOLES FOR CORE DRILLING  
PROPOSED  $\phi$  OF EMBANKMENT  
STRAIGHT RUN

Scale 1" = 500'

FIGURE 7

Revised 12-20-65



APPENDIX G  
REGIONAL VICINITY MAP

